International Journal of Exploring Emerging Trends in Engineering (IJEETE)
Vol. 03, Issue 02, Mar-Apr, 2016 Pg. 112 - 121 WWW.IJEETE.COM

LOCALITY BASED P2P LIVE MEDIA STREAMING USING CLOUD COMPUTING

Preetha Evangeline D#1, Raju*2, Dr. Anandhakumar Palanisamy#3

[1]Research Scholar [2]PG Student [3]Professor , Department of Computer Technology, Anna University Chennai, India

ABSTRACT - *In the modern world multimedia streaming is the most popular applications over the internet. Peer-to-peer (P2P) video streaming is a raising technology that lowers the constraints imposed in the stream vital events by the Internet. Moreover, it has been highly globalized, because of this globalization user demands and their needs increases exponentially. But the problem in the P2P streaming system is satisfying the real time constrains like genesis of stream and its actual distribution to the user and also bandwidth allocation for the particular location. With the multichannel P2P system it is difficult to predict the location and allocate channel bandwidth needed by the user. Congestion in the accessible upload bandwidth, both through the media source and innermost the overlay network, may restrict the quality of service (QoS) accomplished by users. In order to satisfy the user demands it needs an effective technology. So the concept of cloud computing plays a vital role in providing solutions for the existing problems in live media streaming. It is an effective technology which provides enormous support for all the application which is related to internet. The main objectives of cloud are cost effective, flexible, and scalable and it provides a huge amount of storage platform for applications. To provide solution for the bandwidth bottleneck in the streaming network. The main contribution of this thesis is enhancing p2p video streaming with cloud computing to provide better quality of service. The overlay used in dissemination process takes the complexity of O (log n) which reduces the start-up delay in streaming. The first proposed algorithm mainly concentrates on improvising the playback continuity and handling the dynamic nature of peer by managing the computational nodes provided by the cloud on demand and prediction based bandwidth allocation ,VBCCA, SDP, MCA schemes which reduces streaming delay as well as increase the QoS by 38%.*

Keywords— Bandwidth allocation, Pricing, Resource allocation, Streaming, Multimedia Cloud.

INTRODUCTION

Live media streaming through the internet has turn into more popularized over the year. In the olden days media streaming was performed using client-server model .In this client will send the request to the server and server will respond back to the request. But it is very expensive to provide robustness and scalability over the client server model. An alternative remedy for this problem is to use the IP multicast. Even though multicast mechanism is efficient in media streaming over the network, it is not used in practice due to its limited network-level support by Internet Service Providers. Application level multicast is another type of approach, in this approach it uses the overlay networks to distribute large number of media stream to large number of users. A Peer-to-Peer (P2P) overlay is a type of overlay structure in which each node simultaneously functions as both a client and a server. In this network structure capacity of the system increases with increase in the number of node. Since each node in the network contributes it resources, the node which have the media that is requested by the requesting node is sent anywhere in the network with relatively low cost compared to client-server model.

P2P overlay network have lowered the barriers faced by the client server model with the help of high scalability and low cost and also it has revolutionized the media streaming technology. But at the same time it is necessary to think about the quality of service perspective with the new technology. The media streaming is globalized, demand from various part of the users in the world becomes even dynamic. It is full filled by providing resources at the predicted dynamic basis to enhance the QoS. In[2] P2P network nodes are either arranged in ordered or unordered way to assigning the resource, disk capacity, bandwidth and computing capacity. In static P2P network statistic of nodes including the capacity of the system is fixed it will not get vary. But in the case of dynamic p2p network the statistic of nodes and system

capacity are not constant one it will be changed accordingly. The peer's will join and leave anytime in the network. It is the challenging issue in p2p network.

In the p2p network there are two type of node is present one is contributing node and other one is free rider. In the contributing follow various dissemination protocols for downloading and uploading source to other nodes. But in case of free rider compare to number of files downloaded, the uploaded file is less. The issue here is while the Free Riders keep downloading the files and keeping it along with them, the load of the system becomes very heavy. And also here once the file is downloaded from the server it is not uploaded back to any nodes so there will be an packet loss occurs. The system again has to search for that particular missing file from various sources like the backed up storage. So the effect of free riders will make the delay in the process. In order to avoid this kind of problem an intensive based mechanism was introduced in the stable nodes. The intension is to make all the nodes to participate in the network activity and to reduce the degradation of system fairness. When the p2p streaming network consists of multiple channels, it is difficult to allocate the bandwidth required for the user in the particular location. If the streaming network consists minimal server capacity, it not possible to allocate the server bandwidth on dynamic basis. To overcome issue faced by the network cloud plays a vital role.

RELATED WORK

This section lists out the various research works related to the problem that we have considered and features and the drawbacks of such approaches. As already mentioned, multimedia streaming requires cloud computational resources to a great extent.

[1] This framework uses different algorithms like random algorithm (RAND), lowest delay clustering algorithm (LDC), maximum bandwidth clustering algorithm (MBC), intra-AS clustering algorithm (ASC), geo-clustering algorithm (GC) to define locality and neighbour selection strategies .They have used many parameter to evaluate and provide the trade-off between the P2P users and ISP. For the simulation purpose they have taken dataset from the Bit Torrent and Cool Streaming, a familiar P2P content-sharing application to enhance the P2P network. But the algorithms like latency-based algorithm and bandwidth-based algorithm cannot keep traffic locality. Also they haven't taken any consideration for congestion of the network. [3] Proposed a P2P overlay for live P2P video streaming and it is evaluated with formalism of Fluid Stochastic Petri Nets (FSPNs) and/or Discrete Event Simulations. In this framework the peers are organized into segments and levels. It consists of one model and control server for the network. This approach reduces the locality awareness, low control traffic, low playback delay, fast network recovery, incentives. Yusuke [4] Proposed content recommendation system which consists of three elements to recommend accurate content to the users. First thing is similarity based, second is distribution of recommended system, third and final thing is play-back initiation. But instead of centralized content distribution here they used decentralized content distribution. [5] Proposed a novel approach to construct the overlay architecture and this over lay network construction consists of two phase, first phase for the identification of location and the second phase consists of various metrics for the neighbour selection. It reduces the end-to-end delay and playback delay only for certain algorithms but it induces the link stress and stretch of delay network. Also the peers suffer from upload bandwidth, distortion when network diameter is increased, because the algorithm used here is not appropriate for the live streaming.[6] Proposed a distributed locality-aware neighbour selection algorithm for P2P video streaming applications over multi-hop wireless mesh networks. Here instead of selecting peers randomly from the network they have identified the best neighbour by determining the distance between the peers and this framework follows the IEEE 802.11 standard. It reduces the start-up delay and video distortion rate compared to average random selection algorithm. But still it faces the problem with topology changes in the mesh network. [7] Here, it provides the clear view about the impact of locality awareness of designing the P2P live streaming mechanism in the reduction of intra and inter network traffic. Also consideration of collaboration between the ISP and P2P system. In the simulation, it improves the performances of the intra and inter traffic network without making any changes in the P2P streaming system. But it doesn't provide the enough frameworks for the practical aspect. [8] Proposed a LANCStream (locality-aware and network coding based P2P live streaming system) to provide solution for the cross-ISP traffic problem and also to improve the performance of P2P live streaming system. Here, they have combined both tree and mesh network and formed hybrid network .moreover they used push and greedy

technique for the implementation to solve the problem. Even though it reduces the cross –ISP traffic but it suffers from peer's selfless.

[13] Proposed a novel Cascading Hierarchical Streaming. This approach consists of overlay network architecture with dual mode algorithms. The proposed approach consists of four levels, each level are mainly focuses on timing from the video source and total amount of upload bandwidth. By introducing the levels in the peers, which will supports the peers to utilize more upload bandwidth and to find the neighbour selection in the various levels. This approach reduces the traffic between the AS and improves the unpopular channel quality.[14] Proposed OLIVES which is a new form of overlay used for LIVE P2P Streaming mechanism. Its supports ISP-friendly streaming mechanism for performing live video streaming. Here in order to overcome constrains which is involved in the localization it includes two tier block scheduling . It is particularly suitable for P2P overlay network because of having basic scheduling at the sub stream level, so it is easy to identify the missing blocks in the video streaming with minimal overhead in the network and also it reduces the buffer requirements which is involved in the streaming.

[15 Proposed a mechanism for managing huge amount of crowd in order to reduce the start up delay and increase the performance in the presence of flash crowds. Here it uses the fluid model for grouping up the system capacity, start up latency and recovery time for from the flash crowd as well as without including the system admission control. Moreover to handle the flash crowd at any time it is usually will increase the departure time. Another thing is whenever the flash crowd scenario arises it will increases the start up latency by logarithmic value.

[18] Proposed a novel Cloud-based P2P Live Video Streaming Platform (Cloud) that introduces the concept of using public cloud servers, such as Amazon EC2, to construct an efficient and scalable video delivery platform with SVC technology. It addresses the problem of serving video streaming requests by using the least possible number of cloud servers. A multi-tree P2P structure with SVC is proposed and online client join/leave algorithms are also provided to efficiently organize and manage the cloud servers to serve all client requests. Compared to the traditional single delivery tree architecture, the proposed structure can save around 50% of the total number of cloud servers used, and improve about 90% of benefit cost rate. [24] Proposed a generic framework which provides the basics of migration from the traditional framework for live media streaming and reduces the cost .First it was implemented with small lease based cloud server problems and then they have introduced optimal algorithm to make leasing mechanism more effective. But the problem with this paper is, it was only implemented with few cloud service providers, it is not able to support all the service providers, also lease based mechanism in not an effective one.

[28] proposed SAVE, an efficient mechanism which introduced operations like joining and switching of channels in order to support multiple channel viewing and low switch delay, low server overhead. The important feature of SAVE is it consists of channel switching activates which identifies the social relationship among the channels to cluster the frequently communicating channels as one group by merging and making bridges within the overlays. By doing this it increases the probability of the older user to identify the interested channels within the clustered one. And it also consists of friend list which records the similar interactions, Movie watching time, patterns. It also consists of capacity based and channel closeness based chunk pushing mechanism to improve the system overall performance.[24] Proposed a new auction based mechanism which is used for optimizing the allocation of upload bandwidth in each peer. Essentially, peers use a barter mechanism during the payment process in the auction. The allocation amount is decided and done dynamically during the auction process, thereby avoiding the issues of price fixing, which is identified as a common challenge in the existing auction algorithms.

[29] Proposed a Reputation based Method which was mainly focused on the behaviour of the peers. Based on the peer behaviour it provider the better quality of service It consists of two major groups one is Autonomous reputation and another one is Global reputation, in the first scheme peers locally stores the repudiated information at locally and keeping this information long time is difficult for further implementation of autonomous system. On the other side second approach, But control overhead is more in the case of second approach like exchanging the information . The main drawback of this approach is implementing this procedure in P2P network is major problem as well as it doesn't provides scalability. This framework also provides the same information about migration to cloud assisted media streaming. But still it doesn't implemented on the other cloud service provider

,even though it doesn't support other service provider the available framework provide enough performance and cost effectiveness to the Amazon EC2 and PPTV.

PROPOSED SYSTEM

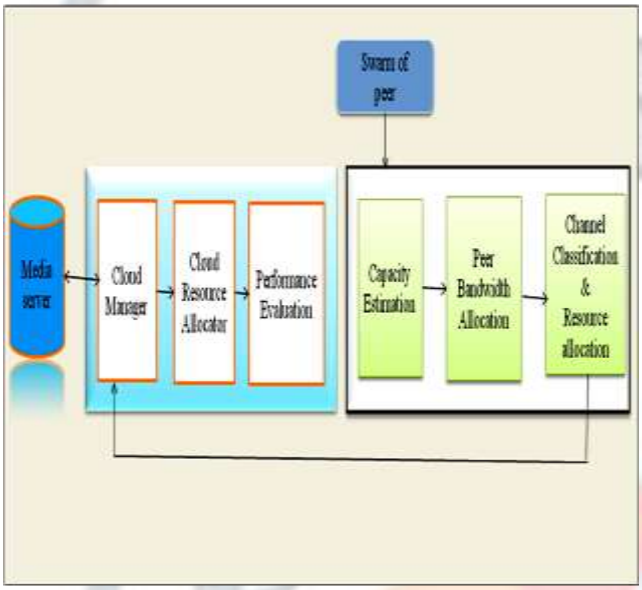

Fig 1. Overview of the system

The system overview consists of e basic elements like streaming media server, a swarm of peers, Computational helper, Storage helper, Cloud Manager (CM) and Bootstrap Server (tracker). In figure 1 shows that Initially the overlay is constructed between the available peers in the network an group of peer is called as swarm of peer ,swarm capacity is calculated with the help of tracker system. Each node in the system is identified by the unique ID. Once the peer joins in the network it is given an unique ID and it is added in the client set. So it will be identified by other peer in the list, from the client list total number of peer and its capacity is identified an where the location of the peer also get identified. Bandwidth for the peer is calculated by prediction based bandwidth allocation mechanism. And also in order to perform the streaming process each peer has to select the proper channel to do the streaming. If the available server capacity is not enough to provide the bandwidth for the further peers, it will be recommended to acess the bandwidth help from the cloud manger.

In order to perform efficient streaming process between the available peers in the overlay system, it requires an proper bandwidth allocation policy to do the task. Proposed prediction based bandwidth algorithm allocates bandwidth for the peers by predicting the peers upload and download capabilities .After allocation of bandwidth to the peers it has to select channel from the available channels. Proposed viewership based channel classification algorithm classifies the channels based on the viewership values obtained by the algorithm.

```
Algorithm: VBCCA
Input: No.of_peers (Np), Tc,(C1, C2,   C3)), t.
Output: channel classification
Step 1: Obtain the total channel
Step 2:
        While(Np==0)
                 Print   Unable to classify the
channel
            if(Np!=0)
                  for( t=1;t<3;t++)
                   Calculate viewership of C1
                   {
                    if(peer>x && peer<x)
                    Vr = Np/Viewed peers
                    print the viewership value of  C1
                    }
                    t++;
                   for( t=1;t<3;t++)
                   Calculate viewership of C2
                   {
                    if(peer>y && peer<y)
                    Vr = Np/Viewed peers
                    print the viewership value of C2
                    }
                    t++;
                    for( t=1;t<3;t++)
                    Calculate viewership of C3
                    {
                     if(peer>z && peer<z)
                    Vr = Np/Viewed peers
                    print the viewership value of C3
                    }
                    t++;
              end
     end

Step 3:   Add viewership values
Step 4 :  Compare viewership values
Step 5:   print the channel order
```

The above algorithm classifies the channels into active, moderate and less active channel. Bandwidth is allocated based on the priority specified in the classification. It represents the peers that use the channel in the particular time for uploading and

downloading the video as well as viewing and sharing the video content. In the framework based on the priority and prediction of the user activity the channel is classified. In the existing system work they have classified based on the relationship between the peers and channel capacity and so on.

Once channel is classified based on the viewership values server allocates required bandwidth for the channels based on the popularity index. To perform efficient resource allocation our proposed work consists of supply and demand policy and IBAP(Incremental Bandwidth Allocation Procedure), if the predicted users for the particular channel is within the fixed limit, bandwidth allocation is performed by using the IBAP policy one and if it is exceeds the limit of the server capacity the bootstrap node initiates the IBAP policy two, otherwise it will send request to the cloud server for the extra bandwidth resource.

Algorithm: supply and demand approach
Input: Total_Channel (Tc), Cd, Asr.
output: Resource allocation
** Cd –Channel demand, Asr-*
*Available server resource */*
Step 1: Initialize minimum bandwidth for channels
Asrc ← Asrmin, for all c € C,
Step 2: Compute required server capacity
Cd = (No.of _active), for all c € C,
for all c € C,
If (Cd > asr)
Else
If (cd < asr)
Cd = (Normal_peer) , for all c € C,
Remaining = Asr-(Cd)
End if
End for
Step 3: Allocate Min bandwidth for individual channels
largest active peer = (Maxup, Mindw)
Alloc(up, dw) =(Asr/(3/4))
Re ← Normal(up, dw)= (Asr-Asr/(3/4))
While (Re>Normal)
If(Maxbw < Normal)
Readjust the Maxbw
Update (Maxbw)
End while
Step 4: Check for peer's arrival
Check channel capacity
Capacity (Npeer, exceded)
Not exceeded (goto Step2&3)
If exceeds
Reroute (available, using)
Goto Step 2
Step 5: if server capacity not enough
Initialize request to cloud manger
Cloud_Request (Up, Dl, v_size, Cost)
Check cost for additional bandwidth
Step 6: Asr ← Bw , for all c € C
Step 7: End process

Once the channel is classified based on the peer traffic in the particular channel at the specified time, it is important to effectively allocate the resources based on the channel capacity and with minimal server resources.

∑k=1N (Qk) (Pk) - - - - -- - - -- - - -- - - - - -- - - - - - - - (1)

(N) Number of channel, (Qk) Quality of the streaming rate, (Pk) Predictability of streaming quality.(K) Number of subsystem.

Qk= (Kk, Ss,k, Ds,k) - - - - - - - - - - - - - - - - - - - (2)

(Kk) Number of subsystem, (Ss,k) server upload resource, (Ds,k) Server download resources.Predictability of the P2P system Depends on the available upload and download resources equals the total number of resources
.

∑ Ss,k, +∑ Ds,k = ∑ Bk - - - - - - - - - - - - - - - - - - (3)

In the above equation if both the values are equal it will provide enough quality of service, otherwise it will reduces the Qos.

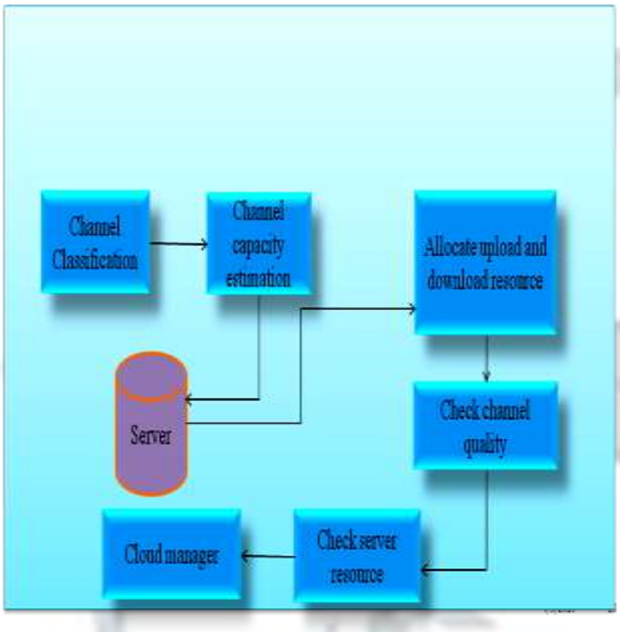

Fig 2. Channel resource allocation

The above figure 2 describes about overall process involved in the resource allocation. Initially it allocates the bandwidth from the available server, if the demand for the particular channel or number of channel is exceeds the sever capacity it excecute the IBAP policies which is present in the streaming process, furthur if it needs additional bandwidth it will be obtained from the cloud server.

Cloud Intrgration:

Cloud Integration part playes major role in the mulitichannel bandwidth allocation mechanishm it actually reduces the number of server required for the streaming as well as to increase the streaming quality.The important feature of cloud integration is to reduce the cost which is involved in the additioanal resource incurred from the cloud manger. Actually it calulates cost for the number of frames which is required for the streaming not the entire MB of data being used for the process.

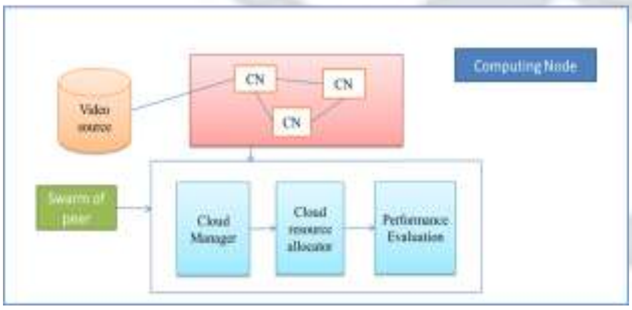

Fig 3. Cloud Process

Cloud Integration part consists of Computing node, computational helper to calculate the amount of resource required to make the streaming process effectively.Here cloud manger act as an interface between swarm of peers and cloud interfacing unit ,It finds the available bandwidth in the streaming server. After evaluating the available bandwidth it will provide the required additional bandwidth for the chunk streaming.

Once the additioanl bandwidth is obtained from the cloud server the proposed Minimal Cost estimation appraoch calculates the incured resource cost bansed on the frame useage allocated for the channles no the hole.

Algorithm: *Minimal cost Estimation Approach*
Input:video_length(Vl),Upload_resource(Ri),Download_resource(Di),
Cost(ci),Ru,Rd,Trr.
Output: allocated resources(Ac), Cost.
Step 1: Estimate the server resource
Step 2: Enter the video length and segment into frames
Step 3: while(Sr!=Empty)
Ti= (Vl, Ri) / server resource is enough for upload and download*
Step 4: If(Sr==Ti)
Continue
end
else
break
Step 5: Initiate request to cloud server
Check for resource required /(Tr) total resource*
*Trr = No.of frame*resorce(x)*
Ru= Tfr_size-(allocated frame)
Rd= Tfr_size-(allocated frame)
Step 6: Estimate cost for upload
for(i=0; i<=n;i++)
*Ci= fr_size*y*
Ci=Ci+y
return
for(j=0; j<=m;i++)
*Cj= fr_size*z*
Cj=Cj+z
Return
Total= Ci+Cj;
End for
Step 7: check feasibility.
Step 8: End

International Journal of Exploring Emerging Trends in Engineering (IJEETE)
Vol. 03, Issue 02, Mar-Apr, 2016 Pg. 112 - 121 WWW.IJEETE.COM

IMPLEMENTATION AND RESULTS

We have implemented the project with three proposed algorithms and the results are analysed with various parameter and features. the below graph shows the statistical analysis of the channels at each intervals.

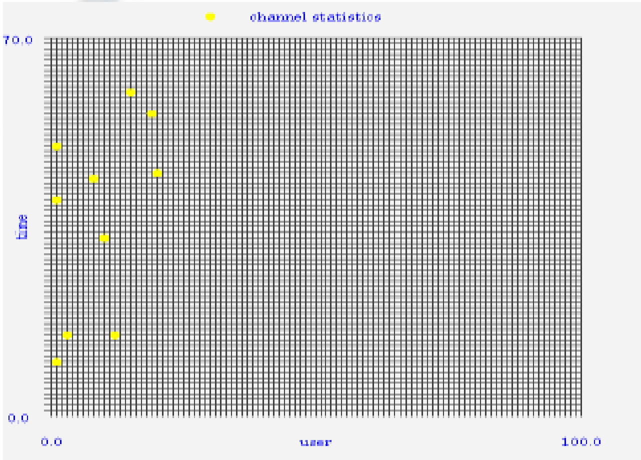

Fig 4. Channel Statistics

It represents about the tradeoff between time and number of users in the channel, each points represents the viewership values of the channel at particular time. Our proposed VBCCA

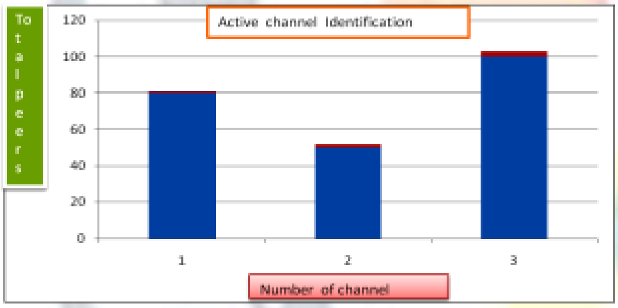

Fig 5. Channel prioritizing

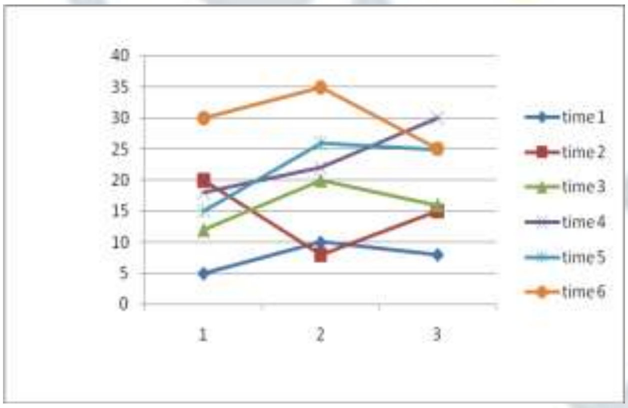

Fig 6. channel classification

algorithm categorize channels based on the viewership values at each intervals. Fig 5 describes about the tradeoffs between time and channel users.

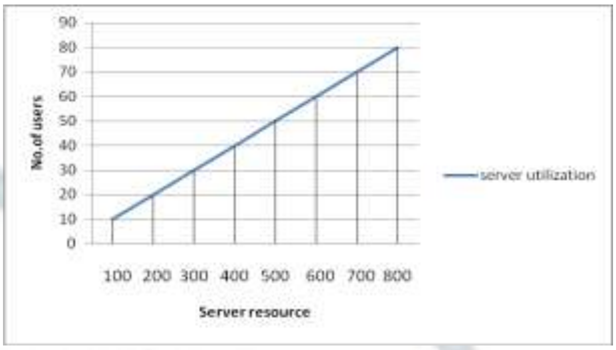

Fig. 7. server utilization without IBAP

We The above fig 7 represents about server utilization for number of nodes presents in each time interval, if number of user in the channel increases it will increase the server bandwidth utilization as well as some time it will degrade the server utilization factors and for each users it minimally allocates 10 Mb of bandwidth for the upload and download.

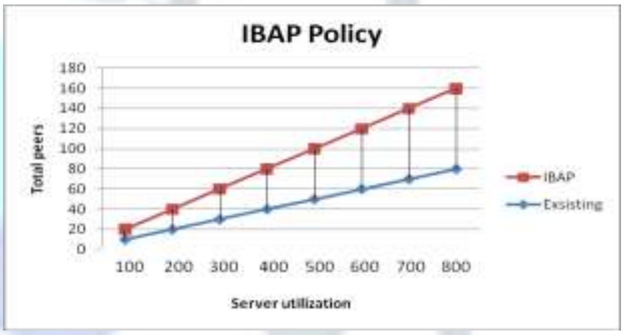

Fig 8. server utilization with IBAP

Fig. 9. channel bandwidth utilization with IBAP

The following graph shows the bandwidth utilization factors for the channels as well as server utilization. Fig 8 and 9 represents about the IBAP policy to allocate bandwidth for the channels and server.

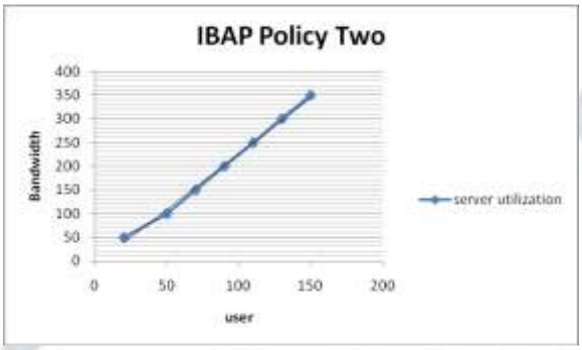

Fig 10. Utilization factors IBAP Two

IBAP Policy two is initiated whenever the user for the particular channel or the server resource is unable to provide the bandwidth required for the upcoming requests. It is plotted between the user and the bandwidth required for the each users.

CONCLUSIONS AND FUTURE WORK

We have proposed a novel resource allocation algorithms algorithm Supply and demand approach(SDA), Incremental Bandwidth allocation Policy(IBAP), Minimal Cost estimation Approach, Efficiently calculates the amount of resource required for the users and channels to perform the streaming process as well as upload and download process. Actually VBCCA algorithm calculates the viewership values of all the channels which is involved in the streaming process. After the identification of the values it categorizes channel for bandwidth allocation so it will reduces the overhead in the bandwidth allocation procedure. To provide more efficiency towards the objective of this project proposed IBAP policies accurately calculates the server bandwidth availability and channel users in each time intervals for allocation bandwidth their by it will increase the overall server capacity to provide resource for the additional users which is present in the streaming process. Proposed MCA algorithm calculates the cost for the extra bandwidth which is obtained from the cloud manger, here instead of calculating cost for entire bandwidth size the proposed algorithm only calculates the used amount of resource like frame size. Overall VBCCA, SDP, MCA schemes which reduces streaming delay as well as increase the QoS by 38%.

REFERENCES

[1] Xiongfei Weng, Hongliang Yu, Guangyu Shi, Jian Chen, Xu Wang, Jing Sun, Weimin Zheng (2008): Understanding Locality-awareness in Peer-to-Peer Systems,IEEE International Conference on Parallel Processing, Ohio, USA,.Pp.59-66.

[2] F. Lehrieder, S. Oechsner, T. Hofeld, Z. Despotovic (2010), W. Kellerer, M. Michel, Can P2P-Users Benefit from Locality-Awareness, IEEE P2P proceedings, Delft, Netherlands.Pp.1-9.

[3] Zoran Kotevski and Pece Mitrevski: Level Aware Model for Peer to Peer Live Video Streaming 2011, Proceedings of the ITI 2011 33rd Int. Conf. on Information Technology Interfaces, Dubrovnik ,Croatia, pp 220-232 .

[4] Yusuke Hirota, Takayuki Hisada, Hideki Tode, Koso Murakami (2011), ‘P2P Live Streaming System with Content Recommendation Based on Users,’ International Conference on P2P, Cambridge, United Kingdom, Parallel, Grid, Cloud and Internet Computing, pp.361-365.

[5] Navid Bayat, Behzad Akbari, Hamid R. Rabiee and Mostafa Salehi (2012): Locality Aware P2P Overlay Architecture for Live Video Streaming, 6’th International Symposium on Telecommunications (IST'), tehran, Iran.Pp.650-655.

[6] Faranak Moayeri, Behzad Akbari, Mohammad Khansari, Behnam Ahmadifar (2013) : A Distributed Locality-aware Neighbor Selection Algorithm for P2P Video Streaming over Wireless Mesh Networks, 6’th International Symposium on Telecommunications (IST'2012).Pp 115-122.

[7] Mohammad Z Masoud, Xiaojun Hei, and Wenqing Cheng (2012): Constructing a Locality-aware ISP-friendly Peer-to-Peer Live Streaming Architecture, IEEE International Conference on Information Science and Technology , Wuhan, Hubei, China; March 23-25, 2012.Pp.368-376.

[8] Takumi Miyoshi, Yuki Shinozaki, Olivier Fourmaux (2012): A P2P Traffic Localization Method with Additional Delay Insertion,Fourth International Conference on Intelligent Networking and Collaborative Systems, Bucharest, Romania.Pp.148-154.

[9] Mohammad Z Masoud, Xiaojun Hei, and Wenqing Cheng (2012): On the Impact of Network Address Translation on Locality-aware P2P Live Streaming Systems, IEEE International Conference on Information Science and Technology Wuhan, Hubei, China; March 23-25, 2012.Pp.415-424.

[10] Andrew Tanny Liem (2013) : P2P Locality Awareness Architecture In Ethernet Passive Optical Networks ,IEEE International

Conference on QiR (Quality in Research).Pp.306-313.

[11] Laizhong Cui and Nan Lu: LANCStream (2013): A Locality-aware and Network Coding-based P2P Live Streaming System IEEE International Conference on Embedded and Ubiquitous Computing, Indonesia, Pp 220-234.

[12] Miao Wang, LisongXu, and Byrav Ramamurthy (2013), Exploring the Design Space of Multichannel Peer-to-Peer Live Video Streaming Systems,' IEEE/ACM Transactions On Networking, Vol. 21, No. 1, Pp.162-175.

[13] Navid Bayat, Hamid R. Rabiee, Mostafa Salehi (2013): Locality-Awareness in Multi-Channel Peer-to-Peer Live Video Streaming Networks ,IEEE 27th International Conference on Advanced Information Networking and Applications, Barcelona, Spain, .Pp.1048-1055.

[14] Nazanin Magharei, Reza Rejaie, Ivica Rimac, Volker Hilt, and Markus Hofmann(2014), 'ISP-Friendly Live P2P Streaming IEEE/ACM Transactions On Networking,' Vol. 22, No. 1, Pp.244-256

[15] Yishuai Chen, Baoxian Zhang, Changjia Chen, and Dah Ming Chiu(2014), 'Performance Modeling and Evaluation of Peer-to-Peer Live Streaming Systems Under Flash Crowds,' IEEE/ACM Transactions On Networking, Vol. 22, No. 4, pp.1106-1120

[16] Feng Wang, Jiangchuan Liu, Minghua Chen CALMS (2012) : Cloud-Assisted Live Media Streaming for Globalized Demands with Time/Region Diversities, IEEE/ACM Transactions on networking. pp 199-207.

[17] Feng Wang, Jiangchuan Liu, Minghua Che, Haiyang Wang (2014): Migration towards Cloud-Assisted Live Media Streaming, IEEE/ACM Transactions on networking. Pp.1-11.

[18] Mehdi Seydali Seyfabad, Behzad Akbari(2014): CAC-Live: Centralized Assisted Cloud P2P Live Streaming , The 22nd Iranian Conference on Electrical Engineering (ICEE 2014), Tehran, Iran.Pp. 613-125.

[19] Bin Cheng: MediaPaaS: a Cloud-based Media Processing Platform for Elastic Live Broadcasting 2014 IEEE International Conference on Cloud Computing, Alaska, USA, pp 713-720.

[20] Hong-Yi Chang, Ya-Yueh Shih, Yuan-Wei Lin (2012), 'CloudPP: A Novel Cloud-based P2P Live Video Streaming Platform with SVC technology,' 8th International Conference on Computing Technology and Information Management, Seoul, Korea, pp.64 – 68.

[21] Korpeoglu, E. Sahin, C. Agrawal, D. El Abbadi, A. Hosomi, T. Seo, Y.(2013), 'Dragonfly: Cloud Assisted Peer-to-Peer Architecture for Multipoint Media Streaming Applications,' IEEE Sixth International Conference on Cloud Computing, Santa Clara Mariott, USA , pp. 269 – 276.

[22] Chuan Wu, Baochun Li, Shuqiao Zhao (2011): On Dynamic Server Provisioning in Multichannel P2P Live Streaming IEEE/ACM Transactions on networking, vol. 19, no. 5.pp. 154-167.

[23] JzerJoung, Y, Li-Wei, Y & Chien-Tse, F (2007), 'Keyword search in dht-based peer-to-peer networks', IEEE Journal on selected areas in Communications, vol. 25, no. 1, pp. 46-61.

[24] Haiying, S, Ze, L & Jin, L (2013), 'A dht-aided chunk-driven overlay for scalable and efficient peer-to-peer live streaming', IEEE Transactions On Parallel And Distributed Systems, vol. 24, no. 11, pp. 2125-2137.

[25] Chen, Z, Feng, G, Lu, Y & Zhou, Y (2013), 'Improving playback quality of peer-to-peer live streaming systems by joint scheduling and distributed hash table based compensation', China communications, vol. 10, no. 6, pp. 127-145.

[26] Isaac, W, Fan-Hsun, T, Yi-Hsuan, L, Li-Der, C, Han-Chieh, C & Mohammad, S. (2014), 'MR-Chord: Improved chord lookup performance in structured mobile p2p networks', IEEE Systems Journal, vol. 2, no. 99, pp. 1-9.

[27] Simone, C, Luca, D, Marco, P & Luca, V (2014), 'Performance evaluation of a sip-based constrained peer-to-peer overlay', Proceedings of the international conference on high performance computing & simulation, Amsterdam, Netherlands, pp. 432-435.

[28] Yu-Kwong, K & Dingding, G(2011), 'A new auction based approach to efficient p2p live streaming', Proceedings of the IEEE seventeenth international conference on parallel and distributed systems, Tainan, Taiwan, pp. 573-580.

[29] Su, X & Dhaliwal, S (2010), 'Incentive mechanisms in p2p media streaming systems', IEEE Internet Computing, vol. 14, no. 5, pp. 74-81.

[30] Chun-Yuan, C, Cheng-Fu, C & Kwang-Cheng, C (2014), 'Content-priority-aware chunk scheduling over swarm-based p2p live streaming

system: from theoretical analysis to practical design', IEEE Journal on Emerging and Selected Topics in Circuits And Systems, vol. 4, no. 1, pp. 57-69.

[31] Vaneet Aggarwal, Vijay Gopalakrishnan, Rittwik Jana,K. K. Ramakrishnan, Vinay A. Vaishampayan (2013), 'Optimizing Cloud Resources for Delivering IPTV Services Through Virtualization', IEEE Transactionson Multimedia, Vol. 15, No. 4, pp.1213-1221.

[32] W.S. Lin, H.V. Zhao, K.J.R. Liu, "Incentive cooperation strategies for Peer-to-peer live multimedia streaming social networks", IEEE Transactions on Multimedia, 2009.

[33] H. Yaiche, R. R. Mazumdar, C. Rosenberg, "A game theoretic framework for bandwidth allocation and pricing in broadband networks", IEEE/ACM transactions on Networking, 2000.

[34] M. Draminitos, G.D. Stamoulis, C. Courcoubetis, "An auction mechanism for allocating the bandwidth of networks to their users", Elsevier computer networks journal, 2007.

[35] Preetha Evangeline.D is a Teaching Faculty at MIT Campus, Anna University. She obtained her UG degree in B.Tech CSE from Dr.MGR University, Chennai, Masters in Engineering from Karunya University, Coimbatore and she is currently pursuing her Doctoral degree at Anna University, Chennai in the field of Cloud Computing. She has published her papers in 12 international journals and 6 international conferences.

[36] Raju R is currently a student doing M.E computer science engineering at M.I.T campus Anna university Chrompet Chennai and completed B.E in CSE from Velammal Institute of Technology under the affiliated to Anna University.

[37] Dr.P.Anandhakumar is a professor and holds the position of Department Head in Computer Technology, MIT Campus, Anna University. He has got 18 years of experience in Teaching. Under his guidance, 12 PhD's have been awarded and at present guiding 12 Ph.D scholars. His publications are as follows: International journal-45, International conference-53, National journal-2, and National conference-13.

AUTHOR'S BIBLOGRAPHY

Preetha Evangeline.D is a Teaching Faculty at MIT Campus, Anna University. She obtained her UG degree in B.Tech CSE from Dr.MGR University, Chennai, Masters in Engineering from Karunya University, Coimbatore and she is currently pursuing her Doctoral degree at Anna University, Chennai in the field of Cloud Computing. She has published her papers in 12 international journals and 6 international conferences.

Raju R is currently a student doing M.E computer science engineering at M.I.T campus Anna university Chrompet Chennai and completed B.E in CSE from Velammal Institute of Technology under the affiliated to Anna University.

Dr.P.Anandhakumar is a professor and holds the position of Department Head in Computer Technology, MIT Campus, Anna University. He has got 18 years of experience in Teaching. Under his guidance, 12 PhD's have been awarded and at present guiding 12 Ph.D scholars. His publications are as follows: International journal-45, International conference-53, National journal-2, and National conference-13.

